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Draft regulations on exploitation of mineral resources in the Area

Draft guidelines for the preparation of environmental impact statements

Prepared by the Legal and Technical Commission

Contents

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I. Introduction

1. The present Guidelines have been developed to provide practical and technical guidance on preparing an Environmental Impact Statement (EIS) for the exploitation of mineral resources in the Area, as specified in regulation 47 and annex IV of the regulations on exploitation.

A. Purpose

2. The purpose of the EIS is to document and report the results of the environmental impact assessment (EIA). As stated in the Regulations on Exploitation of Mineral Resources in the Area, the EIS shall be in the form prescribed in annex IV and shall be:

(a) Inclusive of a prior environmental risk assessment;

(b) Based on the results of the environmental impact assessment;

(c) In accordance with the objectives and measures of the relevant regional environmental management plan; and

(d) Prepared in accordance with the applicable Guidelines, Good Industry Practice, Best Available Scientific Evidence, Best Environmental Practices and Best Available Techniques.

3. The EIS documents and reports the results from the EIA and provides an impact assessment for the Environmental Effects identified by the EIA, with measures to manage such effects within acceptable levels. As such, the EIS is nested within the broader EIA process. However, while the Standard and Guidelines produced for the EIA process include the reporting stage (the EIS), the present Guidelines have been produced to be stand-alone and address specifically the EIS template provided in annex IV to the regulations on exploitation. That annex provides a high-level EIS template to provide contractors with recommendations for achieving EIA consistency and standardization.

4. The Guidelines should be read in conjunction with the regulations on exploitation, the relevant Exploration Regulations and other relevant Standards and Guidelines of the International Seabed Authority, including but not limited to those related to:

(a) Application for approval of the Plan of Work in the form of a contract (to conduct exploitation activities in the Area);

(b) Environmental impact assessment process;

(c) Environmental Management and Monitoring Plans;

(d) Environmental management systems;

(e) Environmental baseline data collection;

(f) Hazard identification and risk assessment.

5. The Guidelines strongly encourage applicants or contractors to have recourse to the Guidelines on the expected scope and standard of baseline data collection in the preparation of an EIS. The latter Guidelines will assist applicants or contractors to compile and collate the necessary baseline data that form a critical part of the EIA process and its reporting in the EIS, including the description of existing conditions and the assessment of impacts of activities.

6. The applicable regional environmental management plan (REMP) should also be considered by the applicant or Contractor in the EIA process and any management approaches outlined in the REMP incorporated into the management and mitigation methodologies of the EIA and the EIS.

B. Terminology

7. Except as otherwise specified herein, terms and phrases defined in the regulations on exploitation have the same meaning in the present Guidelines.

8. “Effect” is the consequence or outcome of an action or activity during the project. It is typically broader and more functional than an impact (see definition below).

9. “Environmental impact assessment (EIA)” is the process of identifying, predicting, evaluating and mitigating the physicochemical, biological, socioeconomic and other relevant effects of development proposals prior to major decisions being taken and commitments made. This includes all potential effects, both positive and negative, and encompasses natural and anthropogenic receptors.

10. “Environmental Impact Statement (EIS)” is the documentation of the EIA process, which describes the predicted effects of the project on the environment (and their magnitude), the measures that the applicant is committed to taking to avoid, minimize and reduce them where possible, and the residual effects that cannot be avoided.

11. “Environmental risk assessment (ERA)” is a process to identify, analyse and evaluate the nature and extent of activities and the level of risk to characteristics of the environment.

12. “Impact” is the influence of an action or activity during the project on the environment.

13. Except as otherwise specified herein, terms and phrases defined in the regulations on exploitation have the same meaning in the present Guidelines.

II. Environmental Impact Statement: template

14. The applicant or Contractor should prepare an EIS following the template provided in annex IV to the Regulations on Exploitation as appropriate. The format is intended to “provide the International Seabed Authority, its member States and other Stakeholders with unambiguous documentation of the potential Environmental Effects on which the Authority can base its assessment, and any subsequent approval that may be granted”.

15. The recommended format of the EIS template is designed to cover the general content of an EIS, in the recognition that details of methodology or thresholds are likely to be resource- and project-specific. The table of contents recommended in the annex is reproduced below (acknowledging that the EIS template is not prescriptive but a general guide to structure and content), along with the corresponding subsection of the present Guidelines that provides guidance on the specific content of the EIS:

EIS section	*Guideline section*
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1. Executive summary

16. The executive summary is intended to be a non-technical summary that provides a concise overview of the EIA and an initial view of the potential issues associated with the proposed exploitation activity by interested stakeholders. It should include the following elements:

(a) Description of the proposed project and its objectives;

(b) Economic, financial, and other benefits to be derived from the project;

(c) Anticipated impacts of the activity (physicochemical, biological, and socioeconomic impacts);

(d) Mitigation measures to avoid, remedy, or minimize environmental impacts;

(e) Linkages with the development of the Environmental Management and Monitoring Plan (EMMP) and the Closure Plan;

(f) Description of consultation with stakeholders and interested parties.

17. The topics should be covered as succinctly as possible and follow the same sequence as in the main report, to facilitate reference to more detailed descriptions.

18. The Contractor should prepare the executive summary in such a manner that it can form a stand-alone document. The executive summary should include sufficient detail to provide the user with an understanding of the key aspects of the assessment, especially those relevant to decision points.

19. The description of impacts discussed in the executive summary should be aligned with the risk and priority of impacts, which may be determined by consideration of the following:

(a) Size of the project footprint and area of potential impact, as distinct from the area of anticipated impact;

(b) Impacts on the marine ecosystem, with specific reference to the significant findings relating to the physiochemical, biological, and socioeconomic environments during the EIA process.

2. Introduction

20. The purpose of the introduction is to set the scene for the EIA: it sets out the background to the proposal, a summary of the proposed activity (with reference to additional details still to be provided) and outlines the EIA format, so that readers will understand where to look for certain information. The introduction will rely heavily on information included in the Plan of Work relevant to the context and findings of the EIA.

21. This section should include sufficient detail for readers to form an overall impression of the proposed project and how it has developed, and to understand how the EIA is structured. As this section principally provides a road map to more detailed material in the EIA, it may be relatively short.

(a) Background

22. This section should include a short description of the proposed project, including all main activities and locations, and indicate the background work conducted prior to the EIA, such as environmental baseline studies, risk assessments performed as part of prospecting or exploration, and previous consultation with stakeholders.

23. The background should contain highlights from the previous activities and refer the reader to appropriate sections in the EIS for more information.

(b) Project viability

24. This section will present and discuss details of the economic context of the project, provide a justification for project execution and a description of the benefits to humankind. Reference will be made to key elements of the Plan of Work (described more fully in the project description section, II.4) and will probably focus on ecosystem management aspects, namely, physiochemical, biological and socioeconomic considerations. The determination of project viability may include a summary of feasibility investigations related to geophysical, engineering, geotechnical, oceanographic, biological and other components of project operations.

(c) Project history

25. The Contractor should summarize work conducted prior to the EIA. A brief description of the following may be included:

(a) Resource discovery;

(b) Exploration undertaken;

(c) Component testing conducted, including a description of activities, if applicable.

It should be noted that, if component testing was conducted, reports are to be included in an annex to the EIS.

26. Details of resource discovery and exploration undertaken, depth zones, and physical location may be presented in narrative form and accompanied by figures. The time, location, and parties involved in exploration work should be included.

(d) Project proponent

27. This section of the introduction will summarize the credentials of the proponent of the contract, including major shareholders, other contracts or licences held (including in other jurisdictions), previous and existing contracts with the Authority, and the proponent's environmental record. This section should also cover the technological and environmental expertise, capacity and financial resources of the proponent (it is noted that discussion of the technical expertise and experience of individuals performing the EIS is covered in section II.12).

28. The project proponent discussion in the EIS should include aspects in support of the commitments made by the Contractor in the executive summary and in the EMMP.

(e) Scope and layout of report

29. The subsection entitled "This report" in the annex IV template is intended to guide users of the EIS in the effective use of the information contained in the EIS. The section includes the following elements:

(a) Scope: This subsection should include a discussion of what is included in the EIS, and what is considered to be out of scope, based on earlier work. An important aspect here is a link to other supporting information, including the scoping report from early in the EIA process, and previous risk assessments that evaluated low-risk activities and those that received less emphasis in the EIA. Sufficient information must be provided to ensure that the conclusions are properly understood, or readers should be directed to the information used to form the risk determination, to enable them to independently evaluate the risk. The applicant or Contractor should highlight the activities determined in risk assessments to be higher risk and hence the focus of the EIA;

(b) Structure: This subsection should refer to the prescribed structure of the template, but should also indicate where to find information that is not obvious from the table of contents, for example in cases where the EIS relates to a larger project covering several Mining Areas within the Contract Area or for an EIS that contains a large volume of information.

3. Policy, legal and administrative context

30. Relevant policies, legislation, agreements, Standards and Guidelines that are applicable to the proposed mining operation must be discussed in the EIS to demonstrate an understanding of national and international expectations for the Contractor's proposed mining project. While this is relatively straightforward, it is still important to ensure that this section is clear and complete.

31. The Contractor should outline the following aspects that may apply to the proposed activities, and indicate how compliance with them will be assured:

(a) National and international legislation, regulations or guidelines that apply to the proposed exploitation activities;

(b) Non-mining-related legislation, policies or regulations that may be relevant to the proposed exploration activities, such as shipping regulations, maritime declarations, marine scientific research, climate change policies and sustainable development goals;

(c) International agreements, including the United Nations Convention on the Law of the Sea (UNCLOS), the International Convention for the Safety of Life at Sea (SOLAS Convention), the International Convention for the Prevention of Pollution from Ships (MARPOL) and the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (London Convention);

(d) Regional agreements that are relevant to the area of operation, in particular the Authority's appropriate regional environmental management plan;

(e) Standards and Guidelines that will be adhered to during the life of the contract, including the Standards and Guidelines of the Authority; the Equator Principles; the environmental and risk management standards of the International Organization for Standardization (ISO); the environmental management standard of the International Marine Minerals Society (IMMS); and performance standards on environmental and social sustainability of the International Finance Corporation (IFC).

4. Project description

32. The EIS must include a description of the proposed exploitation, providing details of the proposed activities, including relevant diagrams and drawings. In accordance with the template headings and subheadings, the description of the proposed exploitation should cover the following information:

(a) A statement of the objectives sought by the project, including the underlying purpose and need for the proposed action;

(b) The precise location and boundaries of the proposed project (including the Mining Area or Areas and the Contract Area), preferably on a detailed bathymetric map, along with the general location of the project on a regional map;

(c) The type, size, shape, tonnage and grade of the mineral deposit;

(d) The spatial and temporal scale of the mining operation, including the mining sequence and anticipated technologies for exploitation activities;

(e) The volumes of material to be recovered, processed and deposited or discharged into the water column or back onto the seabed;

(f) The depth of penetration into the seabed and the proposed mineral collection technique;

(g) The likely extent of any secondary impacts such as sediment plumes;

(h) The method used to transport recovered minerals to the surface;

(i) The proposed shipboard method for dewatering and separation of the mineral resource from the sea floor sediment;

(j) Method for trans-shipment or transfers at sea of mineral-bearing ore;

(k) The proposed waste management, transport and disposal activities for materials or effluents to be discharged into the Marine Environment, and the management of shipboard wastes to be transported to shore-based disposal facilities, including the handling and management of hazardous materials;

(l) Construction and operation standards for equipment to be used in mining activities;

(m) The workforce, including procedures for preserving the health and safety of the personnel involved in the exploitation activities;

(n) Capacity-building commitments entered into by the Contractor;

(o) Commissioning and decommissioning procedures;

(p) Detailed development timetable for the entire life cycle of the project;

(q) Proposed details of any practicable restoration of the project area.

33. Background information such as project phases, facilities and machinery, and process flow diagrams may be provided as appendices.

34. A key aspect of this section is the description of mining methodologies. Most oil and gas operations use well-known techniques, equipment and overall operating procedures, whereas the mining of seabed minerals is a relatively new activity and there is no standard methodology. Methodologies will vary with mineral type and depth. Where the technology is new or untested, this section needs to be very detailed, as it is fundamental to an understanding of the likely impacts. This should include the operations on the sea floor, and also water column activities (such as riser pipe transfer), and also the methods for disposing of processing water, fine sediment and other by-products. If there are relevant national or international best practices, it will be useful to include an assessment of how the proposed operation will be aligned with them.

35. A description of the overall timetable, from initiation and equipment construction through to decommissioning and closure of operations, is important for determining the extent and nature of various environmental impacts. The description should include the major phases of the operation, together with the milestone dates on which relevant tasks and activities are expected to be completed. The development timetable provided under this section should clearly indicate the different phases in the development proposal. For clarity purposes, a flow chart or Gantt chart should be used where appropriate.

36. In the final section, the Contractor should provide an alternatives analysis demonstrating that reasonable alternatives to the proposed project were rigorously explored and objectively evaluated. Alternative screening criteria typically include the following:

(a) Environmental impacts;

(b) Technical factors;

(c) Logistics;

(d) Financial feasibility;

(e) Stakeholder support.

37. The analysis summary could include a brief description of the preferred alternative and the rationale for its identification, and direct readers to sections of the EIS or other documents setting out full details of the process that led to identification of the preferred option and discussion of eliminated alternatives and the reasons for their elimination.

5. Description of the existing physicochemical, biological and socioeconomic environments

38. This section provides regional and site-specific information on the various environmental conditions at the activity site or sites. The applicant or Contractor should provide a description of the baseline condition of the physiochemical, biological and socioeconomic environment. The aim is to provide a robust environmental assessment against which impacts will be assessed. While the template in annex IV to the regulations on exploitation provides a separate section for each of these parameters, the Contractor should consider the interrelationship of these parameters and the potential impacts of the proposed project on each of the parameters.

39. For each of the three parameters (physiochemical, biological and socioeconomic), the EIS should provide a detailed account of the Contractor's knowledge of the baseline conditions in the proposed Contract Area. These descriptions should be based on both primary data from baseline studies completed in the proposed Contract Area (for example, as part of exploration activities) and secondary information from a review of existing literature and scientific studies for the surrounding region. The Contractor should make use of information maintained in the Authority's DeepData database to examine characteristics of the surrounding area. Maps, diagrams and photographs should be used in each section to clarify and illustrate existing conditions, and relevant prior work in the proposed Contract Area should be included in the appendices to the EIS.

40. The details in these sections should be based on site-specific and regional ERAs that identified the higher-risk impacts that should be emphasized in the EIA. Each section should provide a robust environmental assessment against which impacts can be assessed. The level of detail in each section should be commensurate with the scale and intensity of the proposed activity.

41. The sections on the physicochemical and biological environments should include the following common descriptions and discussions:

(a) Key messages (overview of the main findings, covered in six or fewer bullets);

(b) Regional overview (general environmental conditions within a broader regional context, including a regional reference map);

(c) Studies completed (including environmental reference baseline data collected in accordance with the exploration contract and contained in the DeepData database);

(d) Summary of the existing (physiochemical, biological or socioeconomic) environment (including key findings and notes on special considerations, and more extensive than the key message section);

(e) Gaps and levels of uncertainty in existing knowledge.

42. Information specific to each of the three environments is described further below.

(a) Aspects specific to the description of the existing physicochemical environment

43. This section of the EIS should also include a discussion of aspects specific to the existing physicochemical environment, including:

(a) Meteorology and air quality (overview of climatology and description of air quality, including chemical characteristics);

(b) Geological setting (general geological landscape and topography, notable characteristics such as hydrothermal vents, seamounts, abyssal hills and canyons, and nature and extent of the resource);

(c) Physical oceanographic regional and site-specific setting (general oceanographic aspects, such as temperature, salinity, stratification, currents and tides and sediment rates);

(d) Chemical oceanographic setting (water mass characteristics at various depths, such as nutrients, particle loads, turbidity and others);

(e) Seabed substrate characteristics (substrate composition, including pore-water profiles, grain size, sediment mechanics and sediment composition);

(f) Natural hazards (potential hazards for the region, including seismic activity, volcanic activity, cyclones, hurricanes and tsunamis) and how these may vary in future as a consequence of climate change;

(g) Noise and light, including intensity, backscatter and attenuation (ambient levels and influence of existing maritime, exploration and exploitation activity in and around the proposed Contract Area);

(h) Greenhouse gas emissions and climate change, including gas and chemical emissions from natural and anthropogenic activities in the region and affecting the sea floor environment and water column chemistry, as well as ecosystem functions and services.

Reference should be made to recommendations of the International Seabed Authority on baseline data collection (ISBA/25/LTC/6/Rev.1) and to the Guidelines on environmental baseline data, for more detail on certain oceanographic and chemical parameters.

(b) Aspects specific to the description of the existing biological environment

44. In addition to the discussion topics listed in paragraph 41 above, this section should include a discussion of aspects specific to the existing biological environment. The Contractor should divide the discussions by depth regime (surface, midwater and benthic, where appropriate) and include a discussion of the various biological components and communities that are present in or make use of the area in and around the proposed Contract Area. By presenting the biological conditions by depth, the users of the EIS can assess linkages between observed or anticipated impacts and the source and location of such impacts.

45. The discussion will address the diversity, abundance, biomass, connectivity, trophic relationships, resilience, ecosystem function and temporal variability of the communities present at each depth. Community-level analyses, previous work with ecosystem models and ecosystem indications should also be included in this discussion.

46. The Contractor should provide a comprehensive list of known species in and around the proposed Contract Area. Taxonomic and ecological groups (ranging from microbial communities to megafauna) that should be included at each depth include:

(a) Surface (from the surface to a depth of approximately 200 metres) – phytoplankton, zooplankton, surface fish, near-surface fish, seabirds, turtles and marine mammals;

(b) Midwater (from a depth of approximately 200 metres to approximately 50 metres above the sea floor) – zooplankton, nekton, mesopelagic and bathypelagic fish, and deep-diving mammals;

(c) Benthic (from approximately 50 metres above the sea floor to the sea floor's surface) – benthic invertebrates and fish communities, including infauna and demersal fish.

47. It should be noted that specific depth intervals for the measurement and presentation of baseline data should be appropriate for the particular environment and that the more detailed description given in the Guidelines should be followed for the establishment of baseline environmental data.

48. It is expected that much of this information will be data collated from the Contractor's own research and baseline data collection during exploration, but can also include other data sources, including:

(a) Literature review to uncover all published records;

(b) Museum, university or research institute collection specimen records;

(c) Research databases available from national or international institutes (including the DeepData database for the region);

(d) Global biodiversity databases available online (such as www.iobis.org and www.fishbase.org for invertebrates and fish respectively).

49. The Contractor should include a description of species composition and abundance. This should include the size distributions of the fauna and their life history stages (such as larval and juvenile stages, which differ from the adult stage). Considerations of species richness, faunal densities and community structures and connectivity should be specifically included. Discussions of species should include considerations of whether they are endemic (restricted to just the site, resource substrate or region) or are known to be rare, threatened or endangered.

50. In addition, this section should include a summary of existing studies of the ecosystems and communities across depths and integrate elements of those studies, including life-history stages, recruitment and behavioural information. Food energy linkages and the complexity of the food web should be included, giving consideration to the impacts that may result from contaminants or other disruptions to the food web. Given the emphasis on the ecosystem approach to management, it is important to consider wider community relationships in respect of which information is available that will enable assessments to move beyond community descriptions to incorporate potential changes in ecosystem function (for example, Armstrong and others, 2012; Tuck and others, 2014; and Thurber and others, 2015). It is common for multivariate grouping and clustering-type analyses to be carried out for benthic invertebrate fauna in particular. Where, however, analyses may span the depth-based habitats, they should be included in the ecosystem and community section. There should, at the very least, be a description and assessment of information on trophic interactions and the linkages between food energy and contaminants in the food chain. Emphasis might be placed on knowledge of trophic levels, the degree of interaction between benthic and pelagic communities, whether there are specialized predators that could be more vulnerable than generalists, and the complexity of the food web and species interactions, with a view to gaining an idea of the resilience of the system to disturbances.

51. Scientific interests may prompt a deeper look and the development of models to quantify the trophic structure and energy flows through the ecosystem. There are a number of ecosystem models that could be considered, as data are collected during exploration phases. Such data can begin to support a trophic model structure that quantifies the transfer of organic material through a food web, such as that based on the widely used mass-balance Ecopath trophic model (Christensen and Walters, 2004). Modelling is likely to become a more common feature of EIAs, enabling

mining-like perturbations to the system to be modelled and assessed (for example, Chatham Rock Phosphate, 2014). Validation or verification of the efficacy of models needs to be included, however, as an integral part of the process.

52. Each of these sections should describe sources and levels of uncertainty in the data or analyses used. There are several available resources to assist the Contractor in evaluating the above aspects and these are not duplicated here. A list of helpful resources that may be used in presenting the existing biological environment may be found in section III.B below.

(c) Aspects specific to the description of the existing socioeconomic environment

53. In addition to the generic discussion topics listed above, this section of the EIS should include a discussion of aspects specific to the existing socioeconomic environment, related in particular to the ecosystem services in and around the proposed Contract Area that might be affected by the proposed project. Because the proposed projects will take place in the Area, direct socioeconomic impacts to specific communities are not necessarily expected.

54. Nevertheless, the project may have social impacts on people, by changing their:

(a) Way of life (lifestyles, work, interactions, recreation, etc.);

(b) Culture (customs, values and beliefs);

(c) Community (cohesion, stability, character and services);

(d) Political and governance systems (such as the extent to which people can control decisions that affect them);

(e) Environment (quality, food security and safety);

(f) Health and well-being (physical, mental, social and spiritual);

(g) Personal and property rights (economic effects and customary rights);

(h) Fears and aspirations (perceptions about safety and the future).

These aspects should be described where relevant.

55. Potential impacts on ecosystem services are included in the regulations on exploitation, with reference to the preparation of an EIS.

56. Accordingly, this section can discuss existing uses that comprise the ecosystem services for the proposed Mining Areas or Contract Area, including but not limited to:

(a) Fisheries (for example, surface-level spawning grounds, nursery areas, or feeding sites, as applicable);

(b) Marine traffic (for example, non-contract-related marine traffic occurring at or near the proposed Contract Area);

(c) Tourism (for example, cruise line routes or areas used for game fishing, sightseeing, marine mammal watching, or other relevant tourism activities);

(d) Marine scientific research (namely, any scientific research being conducted in or around the proposed Contract Area outside of environmental studies or sampling performed for the EIA or EIS or proposed in the EMMP);

(e) Other uses of the area in and around the proposed Contract Area (for example, submarine cables, exploration projects or other exploitation projects);

(f) Sites of archaeological or historical significance located in or around the proposed Contract Area.

57. Relevant area-based management classifications or tools established under subregional, regional or global processes should be identified and the reasons for their designation explained, as this can enhance understanding of the ecological importance of certain areas. The scope, geographical coverage and objectives of such classifications and tools should also be explained.

58. Contractors should also consider characteristics of and issues specific to the proposed workforce as part of the existing socioeconomic environment, including topics such as the health, safety and well-being of personnel involved with exploitation activities and any commitments entered into by the Contractor with regard to capacity-building in the Area.

6. Assessment of impacts on the physicochemical, biological and socioeconomic environments and proposed Mitigation

59. The Contractor should provide an assessment of potential impacts on the physiochemical, biological, and socioeconomic environment. While the EIS template provides a separate section for each of these parameters, the Contractor should also consider the interrelation of these parameters and the potential impacts of the proposed project on each parameter.

60. For each of the parameters (physiochemical, biological, and socioeconomic), the EIS should provide a detailed description and evaluation of the potential impacts that could result from the proposed project. The discussion should consider potential impacts from all phases of the proposed mining activities, and also from potential accidental events. For each of these phases of mining (including accidental events) and for each of the potentially affected environments (physiochemical, biological or socioeconomic, or a combination thereof), the Contractor should include a discussion of the following:

(a) The nature and extent of any actual or potential impact;

(b) Measures that will be taken to avoid, remedy or mitigate such impacts;

(c) Any unavoidable (residual) impacts that may remain.

61. The key objective of these sections is for the Contractor to clearly communicate the nature and extent of residual impacts, the length of time any impact from them will continue, and whether or not the environment is expected to recover (and in what time frame, following disturbance). Each section should focus on the elements identified in the prior ERA that highlighted the higher risk impacts of the proposed mining activity.

62. The level of detail in each section should be commensurate with the scale and intensity of the proposed activity.

63. Each section should include the following:

(a) Key messages (overview of the main findings);

(b) Description of impacts:

(i) Nature and extent of any actual or potential impact, including indirect and cumulative impacts, and interactions across impacts;

(ii) Measures that will be taken to avoid, remedy, or mitigate such impacts (and that will be addressed in the EMMP);

(iii) Unavoidable (residual) impacts that will remain;

(c) Specific discussion of cumulative impacts, including such impacts from proposed operations by the Contractor and other operations in the region;

(d) Summary of the residual effects (for example, in a tabular format).

64. The area of potential impact should be described in detail. This is especially relevant to potential dispersal of impacts beyond the Mining Area or the Contract Area.

65. The sources and levels of uncertainty associated with impacts should be quantified as far as possible. Attribution of confidence to analysis and prediction of impacts is important for understanding both the relative importance of impacts and the likely efficacy of mitigation measures. Assessment of uncertainty should:

(a) Identify relevant areas of uncertainty and gaps in knowledge, with the implications that these have for the environmental impact assessment and its results;

(b) Propose how such uncertainty can be reduced or managed.

66. The Contractor should discuss information on potential recovery times following disturbance and the longevity of residual effects. This will give readers an understanding of the temporal component and efficacy of proposed mitigation measures.

67. Information specific to each of the three environments (physiochemical, biological and socioeconomic) is described further below.

(a) Aspects specific to the assessment of impacts on the physiochemical environment

68. This section of the EIS should also include a discussion of impacts and mitigation efforts specific to the existing physiochemical environment, including:

(a) Meteorology and air quality;

(b) Geological setting;

(c) Seabed substrate characteristics;

(d) Physical oceanographic setting;

(e) Chemical oceanographic setting;

(f) Energy flow pathways (such as hydrothermal fluids);

(g) Natural hazards;

(h) Noise and light;

(i) Greenhouse gas emissions and climate change;

(j) Maritime safety and interactions with shipping;

(k) Waste management;

(l) Other issues.

69. The Contractor should provide a description and evaluation of potential impacts of the proposed project on the physical environment described in associated previous section on existing conditions. Sources of potential impact may include physical disturbance and modification of the seabed during mining activities, sediment plumes that could disperse beyond the footprint of the Contract Area, and the transport and processing of materials conducted at the surface in the Contract Area.

70. Cross references with other sections of the EIS should be provided to enable an evaluation of cause and effect linkages.

(b) Aspects specific to the assessment of impacts on the biological environment

71. This section of the EIS should also include a discussion of aspects specific to the existing biological environment, including:

(a) Surface;

(b) Midwater;

(c) Benthic;

(d) Ecosystem and community level.

72. The Contractor should provide a description and evaluation of potential impacts of the proposed project on the existing biological environment as described in section 5 above. Sources of potential impact should be discussed in terms of their depth regime and at a community and ecosystem level. Sources of potential impact may include increased vessel activities and potential pollution from these vessels; changes in water composition or clarity; noise affecting the food chain and availability of prey; potential oxygen depletion; sediment plume effects in the water column; and bioaccumulation of toxic metals and other contaminants. Temporal and spatial impacts should be discussed in each subsection.

73. It is important that the final ERA associated with the EIA process be considered in this section. Impacts of the mining or drilling operations will depend on the resources, site and methods used and there are many such potential impacts. The following are some of the key effects on biological structure and function that this section should always consider:

(a) Potential surface impacts (0–200 metres):

(i) Increased vessel activities and potential pollution (from vessel discharges and wastes) of the surrounding area;

(ii) Reduction in primary production (for example, through shading by discharges); in shallow or clear deeper water this may affect macroalgae or microalgae on the sea floor;

(iii) Stimulation of primary production by increased nutrient release (such as nitrogen or iron in discharges) in photic depths;

(iv) Reduction in the availability of prey (through changes in abundance, displacement or visibility), with effects on surface and deep-diving mammals and birds, fish and mobile pelagic invertebrates (including through changes in water composition and clarity or through noise and lights);

(v) Impacts of vessel activities on and above the actual sea surface;

(b) Potential water column impacts (200 metres from the surface to 50 metres above the sea floor):

(i) Plankton and mesopelagic fish mortality;

(ii) Toxic effects of the release of metals and other contaminants (such as ammonia and sulphides, causing pH reduction);

(iv) Bioaccumulation of toxic metals though the midwater food chain;

(v) Sediment plume effects through the water column (such as reduction in visual clarity for feeding);

(vi) Potential oxygen depletion at depth;

(vii) Effects on deep-diving marine mammals;

(viii) Potential noise effects (such as direct avoidance, masking faunal communication and feeding disruption);

(c) Potential benthic impacts (sea floor to 50 metres above):

(i) Direct physical impact of mining and sampling gear;

(ii) Smothering and burying of animals by sediment;

(iii) Clogging of suspension feeding structures;

(iv) Toxic effects of the release of metals and other contaminants (such as ammonia and sulphides);

(v) Potential noise effects;

(vi) Loss of essential habitat (such as spawning, nursery and feeding grounds);

(vii) Loss of other habitats and communities of particular biological importance.

74. Impact assessments often focus on the spatial scale, but the temporal nature and extent of impacts are equally important, and these will vary between faunal groups and the source of impact.

75. A number of receptor groups should be considered in assessing impacts on the biological environment. These relate to baseline faunal groups (see the Guidelines on baseline environmental data), and will vary by site, but typically will include:

(a) Primary producers (such as phytoplankton, microalgae and macroalgae);

(b) Pelagic communities (such as fish and squids);

(c) Demersal fish (such as predators and scavengers);

(d) Benthic invertebrates (such as microfauna, meiofauna, macrofauna, megafauna, microbes and protists);

(e) Marine mammals;

(f) Seabirds;

(g) Other rare or endangered species;

(h) Ecologically important or sensitive biogenic habitat-forming species.

These groups form the basis for more integrated community and ecosystem-level assessments of impact.

76. Cross references to other sections of the EIS should be provided to inform the user of cause and effect linkages.

(c) Aspects specific to the assessment of impacts on the socioeconomic environment

77. Socioeconomic impact assessments should:

(a) Identify stakeholders, groups and communities affected by the project;

(b) Describe data covering key socioeconomic issues of the affected communities (such as community history, indigenous communities and culture) that have shaped social and economic development;

(c) Explain methods used to carry out the assessment;

(d) Identify socioeconomic impacts and prediction of the significance, duration and extent of impacts;

(e) Identify potential mitigation measures;

(f) Describe an appropriate monitoring framework.

78. Socioeconomic impact assessments may include consideration of the scale of effects (such as the creation of jobs and estimates of the risk of environmental impacts), extent of duration of impacts in time and space, intensity or severity of social impacts and an assessment of whether impacts are likely to be cumulative. It is important to consider the social equity or distribution of impacts across different populations: in other words, which groups are likely to be affected in which ways. Attitudes towards and perceptions of the proposed project are among the variables that should be considered in determining the significance of impacts.

79. A number of steps can help with constructing the likely nature and extent of potential impacts on existing interests. The steps identified below are recommended by the United States National Oceanic and Atmospheric Administration (1994):

(a) First, scoping and identification of the probable social impacts for each of the existing interests may be based on the consultation process or interviews. Consideration needs to be given to the impacts perceived by affected groups and communities. Principal methods may include public meetings, interviews, workshops, surveys and reviews of the existing social science literature;

(b) Second, the likely and possible effects need to be estimated. The probable social impacts can be formulated in terms of predicted conditions without the proposed activity (baseline projection, from section 6 of annex IV to the regulations on exploitation); predicted conditions with the proposed activity; and predicted impacts, which may be interpreted as the differences between the future with and without the proposed activity;

(c) Third, after direct impacts have been estimated, the assessment should consider how affected people will respond in terms of attitude and actions. Important elements here include proposed mitigation measures. Mitigation includes avoiding the impact by not taking or modifying an action; minimizing the impacts through the design or operation of the project; undertaking restoration or rehabilitation actions, or compensating for (offsetting) the impact by providing substitute facilities or resources.

80. The Contractor can include a consideration of desirable outcomes (such as beneficial impacts) and should include the scale of the effects, expected duration of such effects and an assessment of whether the effects are likely to be cumulative. Potential adverse impacts should be presented using the same format. The Contractor should include a discussion of the probable socioeconomic impacts in comparison to predicted conditions without the proposed project.

81. Economic impacts should be described and should include aspects of profit and loss (net of costs) and effects on employment, including the location of those jobs and the communities that will be affected. Indirect economic effects (such as the benefits of additional jobs, revenue or economic activity in related or secondary sectors) should be identified separately from direct employment and revenue arising from the proposed activity.

82. This section of the EIS should include a discussion of aspects specific to the existing socioeconomic environment, including:

(a) Fisheries;

(b) Marine traffic;

(c) Tourism;

(d) Marine scientific research;

(e) Area-based management tools;

(f) Other.

Impacts on these elements may extend beyond the area of the proposed project and may affect social or economic aspects in a regional setting.

83. Cross references to other sections of the EIS should be provided to inform the user of cause and effect linkages.

7. Accidental events and natural hazards

84. A stand-alone Emergency Response Plan (ERP) should be developed as part of the development of the EMMP, in accordance with the Regulations on Exploitation, pursuant to which the ERP is to be current and based on identified potential hazards, with established procedures for managing environmental emergencies. In addition, the ERP should also state the important emergency contacts that handle environmental emergencies related to the mining activities and the contact details. The ERP should include responses to natural hazards, extreme weather, and accidents.

85. The EIS should refer users to the ERP, but the EIS itself should still include a discussion on environmentally hazardous discharges that could result from accidents or extreme natural events, as these are fundamentally different from normal operational discharges of wastes and wastewaters. The discussion should outline the probability of such accidental discharges, the impact that they could have and the measures that will be taken to prevent or respond to such an event. Residual impacts caused by such an event should also be included.

8. Environmental management, monitoring and reporting

86. The EMMP is separate from the EIS that is submitted with the Plan of Work and is discussed in further detail in a separate Standard and Guidelines. The EIS should refer users to the EMMP and need include only a brief discussion highlighting key issues that will be addressed in the EMMP, including:

(a) Organizational structure and responsibilities;

(b) Environmental management system or systems;

(c) Environmental objectives;

(d) Mitigation and management;

(e) Monitoring plan;

(f) Corrective procedures;

(g) Closure Plan;

(h) Reporting for monitoring activities;

(i) Incident reporting.

87. Nevertheless, the EIS is the document in which the impacts of the proposed project are detailed and sufficient information needs to be provided to enable the Authority to anticipate possible environmental management, monitoring and reporting requirements for an environmental approval. The information listed should reflect the proponent's environmental policy and how that policy is to be implemented to meet the requirements of this section and previous sections during different stages of the project life (namely, from construction to decommissioning and closure).

9. Product stewardship

88. The principles of product stewardship encourage those who design, produce, sell, or use a product to take responsibility for reducing negative impacts on the environment, public health, worker safety, and the economy. The EIS should contain

a description of the intended use of the mineral-bearing ore. This description should address how the Contractor will minimize health, safety, environmental, and socioeconomic effects of the intended product or products, and should address the following potential impacts:

(a) Energy and materials consumption;

(b) Waste generation;

(c) Toxic substances;

(d) Air and water emissions.

89. Proposed product stewardship should be aligned with the Sustainable Development Goals, as applicable. In particular, responsible production and consumption patterns should be established. This entails ensuring that the proposed project does not lead to environmental degradation or overtaxing of natural resources while reducing waste and improving resource efficiency.

10. Consultation

90. This section of the EIS should describe stakeholder engagement activities that took place during the process of the EIA (see the Guidelines on the EIA process), together with any stakeholder consultation activities anticipated after the Plan of Work has been submitted to the Authority.

91. The EIS should include a description of the nature and extent of any consultations conducted as part of the EIA and any consultations expected as part of the EIS public comment period or review by the Authority. This discussion should include a description of the process by which stakeholders were identified.

92. The Contractor should include a description of the protocol used for collecting, logging and responding to stakeholder comments and concerns. The EIS should include an evaluation of how the consultations performed were aligned with relevant consultation obligations, if any.

93. The Contractor should list authorizations and other approvals required to implement the project (both national and international), and a list of related environmental review and consultation requirements under applicable regulations, standards or policies.

11. Glossary and abbreviations

94. The EIS should include a glossary of terms used in the EIS, and also a list of any acronyms and abbreviations used throughout the document. The EIS should also include definitions for specific key terms used in the EIS, regardless of whether they appear in the regulations on exploitation. This will help to ensure that users of the EIS, including the decision-makers and relevant stakeholders, have a clear understanding of the intention behind the use of certain terms in the EIS. The glossary should be included in the table of contents for the EIS and referenced in the introduction section of the EIS.

12. Study team

95. The EIS shall list the names of the persons who were primarily responsible for preparing the statement and any significant background papers, including basic components of the statement. Where possible, the persons who were responsible for a particular analysis, including analyses in background papers, shall be identified.

96. The list of preparers and contributors shall also state their qualifications, including:

(a) Expertise;

(b) Experience;

(c) Education;

(d) Professional disciplines;

(e) Relevant registrations.

97. Curricula vitae of key members of the study team may be included in the appendices if the Contractor determines that this information would be useful to stakeholders reviewing the EIS.

13. References

98. Evidence obtained from outside sources should be documented throughout the EIS, with the use of footnotes or other suitable reference mechanism. In addition, all sources used in preparation of the EIS (including those specifically referenced in the body of the document) should be listed in bibliography format, with full details of the source (including website addresses, if applicable). This enables users of the EIS to review the supporting documentation independently.

14. Appendices

99. The appendices section should include a list of all technical reports carried out for parts of the EIA or that are used in support of any aspect of the EIA (such as prior risk assessments or monitoring activities conducted as part of exploration contracts). Copies of these reports should be provided as appendices to the report, with clear indications as to which aspect of the EIS the document is being provided to support.

III. Information sources

A. Sources

Armstrong, C.W., N.S. Foley, R. Tinch and S. van den Hove (2012). Services from the deep: Steps towards valuation of deep sea goods and services. *Ecosystem Services* 2: 2–13. Available at http://dx.doi.org/10.1016/j.ecoser.2012.07.001.

Australia, New South Wales Department of Infrastructure, Planning and Natural Resources (2004). Guideline for the Preparation of Environmental Management Plans.

Australian Government, Department of Environment (2014). Environmental Management Plan Guidelines.

Chatham Rock Phosphate (2014). Marine Consent Application and Environmental Impact Assessment. Available at www.rockphosphate.co.nz/marine-consent-application/.

Christensen, V., and C.J. Walters (2004). Ecopath with Ecosim: methods, capabilities and limitations. *Ecological Modelling* 172: 109–139.

Clark, M.R., J.M. Durden and S. Christiansen (2020). Environmental impact assessments for deep-sea mining: can we improve their future effectiveness? *Marine Policy* 114. Available at http://dx.doi.org/10.1016/j.marpol.2018.11.026.

Clark, M.R., H.L. Rouse, G. Lamarche, J.I. Ellis and C.W. Hickey (2017). Preparation of environmental impact assessments: general guidelines for offshore mining and drilling with particular reference to New Zealand. *NIWA Science and Technology Series* 81: 103.

Durden, J.M., L.E. Lallier, K. Murphy, A. Jaeckel, K. Gjerde and D.O.B. Jones (2018). Environmental impact assessment process for deep-sea mining in “the Area”. *Marine Policy* 87: 194–202. Available at http://dx.doi.org/10.1016/j.marpol.2017.10.013.

Durden, J.M., K. Murphy, A. Jaeckel, C.L. Van Dover, S. Christiansen, K. Gjerde, A. Ortega and D.O.B. Jones (2017). A procedural framework for robust environmental management of deep-sea mining projects using a conceptual model. *Marine Policy* 84: 193–201. Available at http://dx.doi.org/10.1016/j.marpol.2017.07.002.

European Communities (2001). *Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interventions*. Luxembourg: Office for Official Publications of the European Communities, 2001.

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International Seabed Authority (2020). ISA DeepData. 6 January 2020. Available at https://data.isa.org.jm/isa/map/.

_____ (2012). ISA Technical Study #10: Environmental management needs for exploration and exploitation of deep sea minerals. Kingston: International Seabed Authority.

International Seabed Authority, Legal and Technical Commission (2010). ISBA/16/LTC/2 The International Marine Minerals Society’s Code of Environmental Management of Marine Mining. The Mining Code, 2010. Available at www.isa.org.jm/mining-code.

_____ (2019). Recommendations for the guidance of contractors for the assessment of possible environmental impacts arising from exploration for marine minerals in the Area. ISBA/25/LTC/6.

Le, J.T., L.A. Levin and R.T. Carson (2017). Incorporating ecosystem services into environmental management of deep-seabed mining. *Deep-Sea Research Part II – Topical Studies in Oceanography* 137: 486–503. Available at http://dx.doi.org/10.1016/j.dsr2.2016.08.007.

National Oceanic and Atmospheric Administration (1994). Guidelines and principles for social impact assessment. Inter-organizational committee on guidelines and principles for social impact assessment: 27 p.

Senécal, P., B. Goldsmith and S. Conover (1999). Principles of Environmental Impact Assessment Best Practice. No. 4.

Sharma, Rahul (ed.) (2019). *Environmental Issues of Deep-Sea Mining: Impacts, Consequences and Policy Perspectives*. Cham, Switzerland: Springer.

Swaddling, A. (2016). *Pacific-ACP States Regional Environmental Management Framework for Deep Sea Minerals Exploration and Exploitation*. Suva: Pacific Community.

Swaddling, A., M.R. Clark, M. Bourrel, H. Lily, G. Lamarche, C. Hickey, H. Rouse, S. Nodder, G. Rickard, P. Sutton and R. Wysoczanski (2016). *Pacific-ACP States Regional Scientific Research Guidelines for Deep Sea Minerals*. Suva: Pacific Community.

Thurber, A.R., A.K. Sweetman, B.E. Narayanaswamy, D.O.B. Jones DOB, J. Ingels and R.L. Hansman. 2014. Ecosystem function and services provided by the deep sea. Biogeosciences 11: 3941–3963.

Tuck, I., M. Pinkerton, D.M. Tracey, O.F. Anderson and S. Chiswell. 2014. Ecosystem and environmental indicators for deepwater fisheries. New Zealand Aquatic Environment and Biodiversity Report 127: 143 p.

United Nations, Rio Declaration on Environment and Development, Report of the United Nations Conference on Environment and Development, Rio de Janeiro, 3–14 June 1992, A/CONF.151/26/Rev.l (vol. I), annex.

B. Selected useful links

Topic source	*URL*	*Comments*
Databases		
Ocean Biodiversity Information System (OBIS)	http://obis.org	Global open-access data and information clearing house on marine biodiversity
FishBase	http://fishbase.se/search.php	Database of fish species, distribution and biology
International Union for Conservation of Nature (IUNC)	www.iucnredlist.org	Red List of Threatened Species
Bird Life International	www.birdlife.org	Conservation of bird species
Swiss Seismological Service (SED)	www.seismo.ethz.ch/en/home/	Seismological information worldwide
PBS and The Ocean Alliance	www.pbs.org/odyssey/index.html	Five-year programme, called the Voyage of the Odyssey, designed to gather baseline data on levels of synthetic contaminants in the oceans
Argo	https://argo.ucsd.edu/	International programme that collects information from inside the ocean
Coriolis	www.coriolis.eu.org	Project providing operational oceanography data to monitor and forecast ocean behaviour. Includes sea-surface observation, in situ measurements and assimilation of in situ and satellite data
Rules, regulations and procedures		
International Seabed Authority	www.isa.org.jm/mining-code	Mining Code
International Marine Minerals Society	www.immsoc.org/IMMS_downloads/2011_SEPT_16_IMMS_Code.pdf	Code for Environmental Management of Marine Mining
International Marine Minerals Society	www.immsoc.org/IMMS_code.htm	Code for Environmental Management
Det Norske Veritas (DNV)	www.dnvgl.com/maritime/index.html	Shipping compliance and pollution reduction
American Bureau of Shipping (ABS)	https://ww2.eagle.org/en/rules-and-resources.html	Safety, compliance and environmental protection relevant to offshore operations
Standards and guidelines		
Equator Principals	https://equator-principles.com/resources/	Equator Principals and Association Governance Rules

Topic source	*URL*	*Comments*
ISO	www.iso.org/iso-14001-environmental-management.html	ISO environmental management system standards
IFC	https://www.ifc.org/wps/wcm/connect/c02c2e86-e6cd-4b55-95a2-b3395d204279/IFC_Performance_Standards.pdf?MOD=AJPERES&CVID=kTjHBzk	IFC Performance Standards on Environmental and Social Sustainability

Annex

Review form: EIS content (provided as a checklist to help the applicant or Contractor to evaluate completeness and adequacy of content of the EIS)

EIS section/ annex IV section	*Do the components of the EIS meet these requirements?*	*Relevant section in Guidelines*	*Describe how the EIS meets these criteria*
Executive summary	Is a description of the EIA and its objectives included?	II.1	
	Does the description contain:		
	(a) Goals of the EIA?		
	(b) Overall objectives?		
	(c) Summary of the relationship between physiochemical, biological and socioeconomic environments?		
	Are the predicted physicochemical, biological and socioeconomic impacts of the activity described?		
	Are the residual impacts prioritized based on the magnitude of impact?		
	Does the executive summary summarize the recommended mitigation measures to avoid, remedy or minimize environmental impacts?		
	Does the executive summary include a discussion of the economic, financial and other benefits to be derived from the project?		
	Is a statement of commitment to conservation, preservation and risk mitigation included?		
	Does the executive summary summarize the dialogue between the Contractor with stakeholders and interested parties?		
	Is a statement of commitment in accordance with the draft regulations included in the executive summary?		

EIS section/ annex IV section	*Do the components of the EIS meet these requirements?*	*Relevant section in Guidelines*	*Describe how the EIS meets these criteria*
Introduction 1.1–1.5	Does the introduction provide the necessary context for the sections of the report? Does it indicate where additional information for the EIS can be found? Does the introduction summarize the proposed project rather than the EIA? Is a background section included in the introduction? Is information about previous activities included? Does the introduction discuss the project viability by providing details regarding: (a) Economic context? (b) Justification for the project execution? (c) Benefits? Is a summary of the work conducted prior to the EIA included? Are details regarding the credentials of the proponent for the contract discussed, including the following: (a) Major shareholders? (b) Other contracts? (c) Licences held? (d) Technological expertise? (e) Environmental expertise? (f) Capacity? (g) Financial resources? Is a description of the scope and report structure included in the Introduction?	II.2	

EIS section/ annex IV section	*Do the components of the EIS meet these requirements?*	*Relevant section in Guidelines*	*Describe how the EIS meets these criteria*
Policy, legal and administrative context 2.1–2.4	Does the EIS discuss how the Contractor will address international and national legislation, regulation, or guidelines that apply to the proposed exploitation activities? Does the EIS discuss how the Contractor will address relevant non-mining related legislation, policies, or regulations? Does the EIS discuss how the Contractor will address international agreements such as: (a) UNCLOS? (b) SOLAS Convention? (c) MARPOL? (d) London Convention? Does the EIS discuss how the Contractor will address standards and guidelines that will be adhered to during the life of the contract from groups such as: (a) International Seabed Authority? (b) Equator Principles? (c) International Organization for Standardization (ISO)? (d) International Marine Minerals Society (IMMS)? (e) International Finance Corporation (IFC)? (f) Extractive Industries Transparency Initiative?	II.3	

EIS section/ annex IV section	*Do the components of the EIS meet these requirements?*	*Relevant section in Guidelines*	*Describe how the EIS meets these criteria*
Description of the proposed development 3.1–3.8	Does the EIS contain a description of the proposed exploitation, including details of proposed activities and relevant diagrams and drawings?	II.4	
	Does the EIS include a Contractor alternatives analysis demonstrating that reasonable alternatives to the proposed project were explored and objectively evaluated?		
Description of the existing physicochemical environment 4.1–4.12	Does the EIS include an overview of the main findings, covered in six or fewer bullets?	II.5	
	Does the EIS include an overview of the regional context and regional reference maps for the Contract Area?		
	Does the EIS provide a description of all studies completed, including environmental reference baseline data collected under the exploration contract?	II.5	
	Does the EIS include scientific data contained in the Authority's DeepData database both for the Contract Area and for the regional context?		
	Does the EIS discuss meteorology and air quality, including:		
	(a) Overview of the climatology?		
	(b) Description of existing air quality (including chemical characteristics)?		
	Does the EIS discuss the geological setting, including:		
	(a) General geological landscape and topography?		
	(b) Nature and extent of the resource?		

EIS section/ annex IV section	*Do the components of the EIS meet these requirements?*	*Relevant section in Guidelines*	*Describe how the EIS meets these criteria*
	Does the EIS discuss the physical oceanographic regional and site-specific setting, including: (a) General oceanographic aspects such as stratification and sediment rates? (b) Notable characteristics such as hydrothermal vents, seamounts, and canyons?		
Description of the existing physicochemical environment 4.1–4.12 (cont.)	Does the EIS discuss the sea substrate characteristics and substrate composition, including: (a) Pore-water profiles? (b) Grain size? (c) Sediment mechanics? (d) Sediment composition?	II.5	
	Does the EIS discuss potential natural hazards for the region, including: (a) Seismic activity? (b) Volcanic activity? (c) Cyclones, hurricanes or tsunamis?		
	Does the EIS discuss noise and light conditions, including: (a) Ambient levels? (b) Influence of existing maritime, exploration, and exploitation activity in and around the proposed Contract Area?		
	Does the EIS discuss greenhouse gas emissions and climate change considerations, including:		

EIS section/ annex IV section	*Do the components of the EIS meet these requirements?*	*Relevant section in Guidelines*	*Describe how the EIS meets these criteria*
	(a) Gas emissions from natural and anthropogenic activities in the region and affecting the sea floor and water column chemistry? (b) Chemical emissions from natural and anthropogenic activities in the region and affecting the sea floor and water column chemistry? Does the EIS document the use of best available scientific evidence and best available techniques in studying the above conditions? Does the EIS contain a summary that expands on the key messages above for the physiochemical environment, which includes key findings and also special considerations?		
Description of the existing biological environment 5.1–5.5	Does the EIS include an overview of the main findings, covered in six or fewer bullets? Does the EIS include an overview of the regional context and regional reference maps for the Contract Area? Does the EIS provide a description of all studies completed, including environmental reference baseline data collected under the exploration contract? Does the EIS include scientific data contained in the Authority's DeepData database both for the Contract Area and for the regional context? For the surface depth (surface to a depth of approximately 200 metres), does the EIS discuss the following taxonomic and ecological groups: (a) Phytoplankton? (b) Zooplankton?	II.5	

EIS section/ annex IV section	*Do the components of the EIS meet these requirements?*	*Relevant section in Guidelines*	*Describe how the EIS meets these criteria*
	(c) Surface fish?		
	(d) Near surface fish?		
	(e) Seabirds?		
	(f) Turtles?		
	(g) Marine mammals?		
	For the midwater depth (from a depth of approximately 200 metres to approximately 50 metre above the sea floor), does the EIS discuss the following taxonomic/ecological groups:		
	(a) Zooplankton?		
	(b) Nekton?		
	(c) Mesopelagic and bathypelagic fish?		
	(d) Deep-diving mammals?		
Description of the existing biological environment 5.1–5.5 (cont.)	For the taxonomic and ecological groups listed above, does the EIS discuss:	II.5	
	(a) Diversity?		
	(b) Biomass?		
	(c) Species composition?		
	(d) Species richness?		
	(e) Species abundance?		
	(f) Size of the fauna?		
	(g) Temporal variability?		
	(h) Ecosystem function?		
	(i) Resilience?		

EIS section/ annex IV section	*Do the components of the EIS meet these requirements?*	*Relevant section in Guidelines*	*Describe how the EIS meets these criteria*
	(j) Trophic relationships?		
	(k) Life-history stages of fauna (e.g. larval and juvenile stages which differ from adults)?		
	(l) Community structures and connectivity (including recruitment and behavioural information)?		
	(m) Considerations of endemic species?		
	(n) Considerations for species that known to be rare, threatened, or endangered?		
	Does the EIS document the use of best available scientific evidence and best available techniques in studying the above conditions?		
	Does the EIS contain a summary that expands on the key messages above for the biological environment, which includes key findings as well as special considerations?		
Description of the existing socioeconomic environment 6.1–6.4	Does the EIS include an overview of the main findings, covered in six or fewer bullets?	II.5	
	Does the EIS include an overview of the regional context and regional reference maps for the Contract Area?		
Description of the existing socioeconomic environment 6.1–6.4 (cont.)	Does the EIS discuss the following aspects of ecosystem services:		
	(a) Fisheries (e.g. surface-level spawning grounds, nursery areas or feeding sites, as applicable)?		
	(b) Marine traffic (i.e. non-contract-related marine traffic occurring at or near the proposed Contract Area)?		

EIS section/ annex IV section	*Do the components of the EIS meet these requirements?*	*Relevant section in Guidelines*	*Describe how the EIS meets these criteria*
	(c) Tourism (e.g. cruise-line routes or areas used for game fishing, sightseeing, marine mammal watching or other relevant tourism activities)?		
	(d) Marine scientific research (i.e. any scientific research being conducted in or around the proposed Contract Area outside of environmental studies or sampling performed for the EIA or EIS or proposed in the environmental management and monitoring plan)?		
	(e) Area-based data management tools such as DeepData?		
	(f) Other uses of the area in and around the proposed Contract Area (e.g. submarine cables, exploration projects, or other exploitation projects)?		
	(g) Sites of archaeological or historical significance located in or around the proposed Contract Area?		
	Does the EIS document the use of best available scientific evidence and best available techniques in studying the above conditions?		
	Does the EIS contain a summary that expands on the key messages above for the socioeconomic environment, which includes key findings and also special considerations?		
Assessment of impacts on the physiochemical environment and proposed Mitigation 7.1–7.15	For the physiochemical environment, does the EIS include a description of direct, indirect, and cumulative impacts:	II.6	
	(a) Nature and extent of any or potential impacts?		
	(b) Measures that will be taken to avoid, remedy, or mitigate such impacts?		

EIS section/ annex IV section	*Do the components of the EIS meet these requirements?*	*Relevant section in Guidelines*	*Describe how the EIS meets these criteria*
	(c) Remaining (residual) impacts?		
	For the physiochemical environment, does the EIS include a discussion of:		
	(a) Key messages (overview of the main findings)?		
	(b) Description of impacts, including:		
	(i) The nature and extent of any actual or potential impact, including indirect and cumulative impacts, and interactions across impacts?		
	(ii) Measures that will be taken to avoid, remedy, or mitigate such impacts (and that will be addressed in the environmental management and monitoring plan)?		
	(iii) Unavoidable (residual) impacts that will remain?		
	(c) Specific discussion of cumulative impacts, including such impacts from proposed operations by the Contractor and other operations in the region?		
	Does the EIS discuss the following aspects specific to potential impacts on the physiochemical environment:		
	(a) Meteorology and air quality?		
	(b) Geological setting?		
	(c) Physical oceanographic setting?		
	(d) Chemical oceanographic setting?		
	(e) Seabed substrate characteristics?		
	(f) Natural hazards?		
	(g) Noise and light?		

EIS section/ annex IV section	*Do the components of the EIS meet these requirements?*	*Relevant section in Guidelines*	*Describe how the EIS meets these criteria*
	(h) Greenhouse gas emissions and climate change?		
	(i) Maritime safety and interactions with shipping?		
	(j) Waste management?		
	(k) Other issues?		
Assessment of impacts on the physiochemical environment and proposed Mitigation 7.1–7.15 (cont.)	Does the EIS discuss, at a minimum, sources of potential impact that include:	II.6	
	(a) Physical disturbance of the seabed during mining activities?		
	(b) Sediment plumes that could disperse beyond the footprint of the Contract Area?		
	(c) Potential impact from material transport and processing activities conducted at the surface in the Contract Area?		
	Does the discussion provide cross-references to other sections of the EIS to inform the user about cause and effect linkages?		
	Does the discussion include the expected time to recover following disturbance and the longevity of residual effects?		
	Does EIS include a summary of the residual effects in a tabular format?		
Assessment of impacts on the biological environment and proposed Mitigation 8.1–8.8	For the biological environment, does the EIS discuss a description of direct, indirect, and cumulative impacts:	II.6	
	(a) Nature and extent of any or potential impacts?		
	(b) Measures that will be taken to avoid, remedy or mitigate such impacts?		
	(c) Remaining (residual) impacts?		

EIS section/ annex IV section	*Do the components of the EIS meet these requirements?*	*Relevant section in Guidelines*	*Describe how the EIS meets these criteria*
	For the biological environment, does the EIS include a discussion of: (a) Key messages (overview of the main findings)? (b) Description of impacts, including: (i) Nature and extent of any actual or potential impact, including indirect and cumulative impacts, and interactions across impacts? (ii) Measures that will be taken to avoid, remedy, or mitigate such impacts (and that will be addressed in the environmental management and monitoring plan)? (iii) Unavoidable (residual) impacts that will remain? (c) Specific discussion of cumulative impacts, including such impacts from proposed operations by the Contractor and other operations in the region?		
Assessment of impacts on the biological environment and proposed Mitigation 8.1–8.8 (cont.)	Does the EIS discuss aspects specific to the existing biological environment, such as the following: (a) Depth: (i) Surface? (ii) Midwater? (iii) Benthic? (b) Ecosystems? (c) Communities? This section should also include a summary of existing studies of the ecosystems and communities,		

EIS section/ annex IV section	*Do the components of the EIS meet these requirements?*	*Relevant section in Guidelines*	*Describe how the EIS meets these criteria*
	and temporal and spatial impacts should be discussed in each subsection. For each aspect listed above, does the EIS discuss potential impacts that include: (a) Impacts from increased vessel activities and potential pollution from these vessels? (b) Impacts from changes in water composition, clarity or noise, affecting the food chain and availability of prey? (c) Potential oxygen depletion impacts? (d) Sediment plume effects in the water column? (e) Bioaccumulation of toxic metals and other contaminants? (f) Temporal and spatial impacts? Does the discussion provide cross-references to other sections of the EIS to inform the user about cause and effect linkages? Does the discussion include the expected time to recover following disturbance and the longevity of residual effects? Does EIS include a summary of the residual effects in a tabular format?		
Assessment of impacts on the socioeconomic environment and proposed Mitigation 9.1–9.5	For the socioeconomic environment, does the EIS include a description of direct, indirect, and cumulative impacts: (a) Nature and extent of any or potential impacts? (b) Measures that will be taken to avoid, remedy, or mitigate such impacts?	II.6	

EIS section/ annex IV section	*Do the components of the EIS meet these requirements?*	*Relevant section in Guidelines*	*Describe how the EIS meets these criteria*
	(c) Remaining (residual) impacts?		
	For the socioeconomic environment, does the EIS include a discussion of:		
	(a) Key messages (overview of the main findings)?		
	(b) Description of impacts, including:		
	(i) Nature and extent of any actual or potential impact, including indirect and cumulative impacts, and interactions across impacts?		
	(ii) Measures that will be taken to avoid, remedy, or mitigate such impacts (and that will be addressed in the environmental management and monitoring plan)?		
	(iii) Unavoidable (residual) impacts that will remain?		
	(c) Specific discussion of cumulative impacts, including such impacts from proposed operations by the Contractor and other operations in the region?		
	For the socioeconomic environment, does the EIS include a discussion of:		
	(a) Fisheries?		
	(b) Marine traffic?		
	(c) Tourism?		
	(d) Marine scientific research?		
	(e) Area-based management tools?		
	(f) Other considerations?		

EIS section/ annex IV section	*Do the components of the EIS meet these requirements?*	*Relevant section in Guidelines*	*Describe how the EIS meets these criteria*
	Does the EIS include a discussion of desirable outcomes or beneficial impacts as wells as potential adverse impacts for the socioeconomic environment?		
	Does the EIS include a discussion of the scale of the effects, expected duration of such effects, and an assessment of whether the effects are likely to be cumulative?		
	Does this section provide cross-references to other sections of the EIS to inform the user about cause and effect linkages?		
	Does EIS include a summary of the residual effects in a tabular format?		
Accidental events and natural hazards 10.1–10.3	Does the EIS refer users to a stand-alone emergency response plan, which details identified potential hazards and established procedures for managing environmental emergencies? Does the EIS include a discussion on environmentally hazardous discharges, including probability of occurrence and proposed measures to prevent or respond to such an event?	II.7	
Environmental management, monitoring and reporting 11.1–11.4	Does the EIS refer users to the environmental management and monitoring plan and include a brief discussion of key issues addressed in the environmental management and monitoring plan, including:	II.8	
	(a) Organizational structure and responsibilities?		
	(b) Environmental management systems?		
	(c) Environmental objectives?		
	(d) Mitigation and management?		
	(e) Monitoring plan?		
	(f) Corrective procedures?		

EIS section/ annex IV section	*Do the components of the EIS meet these requirements?*	*Relevant section in Guidelines*	*Describe how the EIS meets these criteria*
	(g) Closure plan?		
	(h) Reporting for monitoring activities?		
	(i) Incident reporting?		
Product stewardship 12	Does the EIS contain a description of the intended use of the mineral-bearing ore and address how health, safety, environmental, and socioeconomic effects of the intended product or products will be minimized, including the potential impacts of:	II.9	
	(a) Energy and materials consumption?		
	(b) Waste generation?		
	(c) Toxic substances?		
	(d) Air and water emissions?		
Consultation 13.1–13.4	Does the EIS clearly identify the stakeholders for the project and their role relevant to approvals and consultation? Does the EIS discuss the nature and extent of any consultations conducted as part of the EIS?	II.10	
	Does the EIS include a description of the protocol used for collecting, logging and responding to stakeholder comments and concerns, and an evaluation of how consultations were aligned with relevant consultation obligations, if any?		
	Does the EIS contain a statement describing the intended use of the EIS, including a list of stakeholders expected to use the EIS? This section should include a list of authorizations and other approvals required to implement the project, and of related environmental review and consultation requirements.		

EIS section/ annex IV section	*Do the components of the EIS meet these requirements?*	*Relevant section in Guidelines*	*Describe how the EIS meets these criteria*
Glossary and abbreviations 14	Does the EIS include a glossary of terms used in the EIS and a list of any acronyms and abbreviations used throughout the documents?	II.11	
Study team 15	Does the EIS list the names of persons responsible for preparing the statement? The list should include the qualifications of the preparers and contributors, including:	II.12	
	(a) Expertise?		
	(b) Experience?		
	(c) Education?		
	(d) Professional disciplines?		
	(e) Relevant registrations?		
	Are résumés of key members included in appendices?		
References 16	Is all evidence from outside sources provided in the EIS documented in footnotes or by another suitable reference mechanism?	II.13	
	Are all references used in preparation of the EIS (including those specifically referenced in the body of the document) listed in bibliography format, including the full details of the sources?		
Appendices 17	Does the EIS include an appendices section with a list of all technical reports carried out for parts of the EIA or that were used in support of any aspect of the EIA or EIS?		